Serial No. 09/905,172

CLAIM AMENDMENTS:

Claims 1-7 (cancelled).

8. (Currently amended) A method of forming a multilayer antireflective hard mask structure, said method comprising:

providing a substrate structure;

depositing a CVD organic layer over said substrate structure by a plasma enhanced chemical vapor deposition process using a feed stream that comprises a hydrocarbon species, said CVD organic layer comprising carbon and hydrogen;

depositing a dielectric layer over said CVD organic layer;

providing a patterned organic photoresist layer over said dielectric layer;

etching said dielectric layer through apertures in said patterned photoresist layer in a first plasma etching step until apertures are formed in said dielectric layer; and

etching said CVD organic layer through said apertures in said dielectric layer in a second plasma etching step until apertures are formed in said CVD organic layer.

9. (Original) The method of claim 8, wherein said dielectric layer is a silicon oxynitride layer.

10. (Original) The method of claim 9, wherein said first plasma etching step is conducted using a plasma source gas that comprises a halogen containing species.

11. (Original) The method of claim 10, wherein said first plasma etching step is conducted using a plasma source gas that comprises a fluorocarbon containing species.

12. (Cancelled)

13. (Currently amended) The method of ~~claim 12~~ claim 1, wherein said hydrocarbon species is propylene gas.

14. (Currently amended) The method of ~~claim 12~~ claim 1, wherein said feed stream further comprises N_2 gas.

15. (Original) The method of claim 8, wherein said second plasma etching step is conducted using a plasma source gas that comprises an oxygen containing species.

16. (Original) The method of claim 15, wherein said oxygen containing species is O_2.

17. (Currently amended) A method of etching a substrate structure comprising:

providing a substrate structure;

providing a patterned multilayer mask structure over said substrate structure, said patterned multilayer mask structure having apertures and comprising: (a) a CVD organic layer comprising carbon and hydrogen deposited over said substrate structure by a plasma enhanced chemical vapor deposition process using a feed stream that comprises a hydrocarbon species and (b) a dielectric layer over said CVD organic layer; and

etching said substrate structure through said apertures by a plasma etching process.

18. (Original) The method of claim 17, further comprising removing remnants of said CVD organic layer after said substrate structure is etched.

19. (Original) The method of claim 18, wherein said remnants are removed by a plasma etching process in the presence of a plasma source gas that comprises an oxygen containing species.

20. (Original) The method of claim 19, wherein said oxygen containing species is O_2.

21. (Original) The method of claim 17, wherein said substrate structure comprises a silicon layer and wherein said silicon layer is etched in the course of said plasma etching process.

22. (Original) The method of claim 21, wherein said plasma etching process comprises a plasma etching step that utilizes a plasma source gas composition comprising a halogen containing species.

23. (Original) The method of claim 21,

wherein said substrate structure comprises a single crystal silicon layer, an oxide layer over said single crystal silicon layer, a doped polycrystalline silicon layer over said oxide layer and a native oxide layer over said doped polycrystalline silicon layer, and

wherein said native oxide layer and said doped polycrystalline silicon layer are etched by said plasma etching process.

24. (Original) The method of claim 23, wherein said plasma etching process comprises two or more plasma etching steps and wherein each of the two or more plasma etching steps utilizes a plasma source gas composition that comprises a halogen containing species.

25. (Original) The method of claim 21,

wherein said substrate structure comprises a single crystal silicon layer, an oxide layer over said single crystal silicon layer and a silicon nitride layer over said oxide layer, and

wherein said single crystal silicon layer, said oxide layer, and said silicon nitride layer are etched by said plasma etching process.

26. (Previously presented) The method of claim 25, wherein said plasma etching process comprises (a) one or more plasma etching steps that utilize a plasma source gas composition comprising an oxygen containing species and (b) one or more plasma etching steps that utilize a plasma source gas composition comprising a halogen containing species.

27. (Currently amended) A method of etching a substrate structure comprising:

providing a substrate structure;

providing a CVD organic layer comprising carbon and hydrogen over said substrate structure by a plasma enhanced chemical vapor deposition process using a feed stream that comprises a hydrocarbon species, said CVD organic layer having apertures therein; and

etching said substrate structure through said apertures by a plasma etching process.

28. (Original) The method of claim 27, further comprising removing remnants of said CVD organic layer after said substrate structure is etched by a plasma etching process in the presence of a plasma source gas that comprises an oxygen containing species.

29. (Original) The method of claim 28, wherein said oxygen containing species is O_2.

30. (Currently amended) A method for trimming a mask feature comprising:

providing one or more mask features on a substrate structure, each said mask feature comprising (a) a CVD organic layer comprising carbon and hydrogen deposited on said substrate structure by a plasma enhanced chemical vapor deposition process using a feed stream that comprises a hydrocarbon species, and (b) a dielectric layer disposed over said CVD organic layer such that sidewall portions of said CVD organic layer are exposed; and

etching said exposed sidewall portions of said CVD organic layer by means of a plasma etching process such that the width of said one or more mask features is reduced at said substrate.

31. (Original) The method of claim 30, wherein said dielectric layer is a silicon oxynitride layer.

32. (Original) The method of claim 30, wherein said CVD organic layer comprises 70-80 % carbon, 10-20% hydrogen and 5-15% nitrogen.

33. (Original) The method of claim 30, wherein said CVD organic layer is etched using a plasma source gas that comprises an oxygen containing species.

34. (Original) The method of claim 33, wherein said oxygen containing species is O_2.

35. (Previously presented) The method of claim 8, wherein said CVD organic layer comprises 70-80 % carbon, 10-20% hydrogen and 5-15% nitrogen.

36. (Previously presented) The method of claim 8, wherein said dielectric layer is a silicon oxynitride layer and wherein said CVD organic layer comprises 70-80% carbon, 10-20% hydrogen and 5-15% nitrogen.

37. (Previously presented) The method of claim 17, wherein said CVD organic layer comprises 70-80 % carbon, 10-20% hydrogen and 5-15% nitrogen.

38. (Previously presented) The method of claim 17, wherein said dielectric layer is a silicon oxynitride layer and wherein said CVD organic layer comprises 70-80% carbon, 10-20% hydrogen and 5-15% nitrogen.

39. (Previously presented) The method of claim 27, wherein said CVD organic layer comprises 70-80 % carbon, 10-20% hydrogen and 5-15% nitrogen.

40. (Previously presented) The method of claim 30, wherein said dielectric layer is a silicon oxynitride layer and wherein said CVD organic layer comprises 70-80% carbon, 10-20% hydrogen and 5-15% nitrogen.